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III.—*On the probable Course pursued by Sir John Franklin's Expedition.* By A. G. FINDLAY, F.R.G.S.

Read, January 28, 1856.

[The following brief remarks will be confined to the physical geography of the region traversed by the Franklin Expedition, and all that we know of its progress.]

At the meeting of the British Association at Liverpool, I laid before the Geographical section a concise view of the polar currents, showing the remarkable contrast that there is between the physical condition of the north and south polar regions—a subject most worthy the attention of the geographer and geologist.

It was there shown that the warm waters of the equatorial regions passed north-eastward from the Gulf-stream, round the North Cape of Europe, along the northern face of Siberia, and thence on to the Archipelago which lies along the N.E. coast of America, pouring out into Baffin Bay by the various channels from a N.W. direction; another portion, passing north of Greenland and then southward along its eastern coast, round Cape Farewell, and afterwards meeting the Baffin Bay current, forming the Labrador current down to and over the Newfoundland banks to beneath the Gulf-stream. These streams have a remarkably persistent character, as will be more particularly shown hereafter. The certain inference from the recorded facts was shown to be that, whatever is floatable in the so-called Arctic basin, must at some period, or in some form, pass out by Davis Strait, or be drifted on to the shores by this current system, without which the whole of the Arctic regions would be one solid mass of perennial ice, the varying margin of which would protrude over the whole of the northern edges of both continents.

The last despatch from the 'Erebus' and 'Terror,' was from off Melville Bay (the Whalefish Islands, near Disco), July, 1845, and they were last seen near Upernavik, with no ice in sight, and in the middle of Baffin Bay, on July 26th, 1845. The last *certain* intelligence of the safety of the ships is given in the melancholy notice that John Torrington departed this life "*on board of H.M.S. 'Terror,' Jan. 1st, 1846.*"

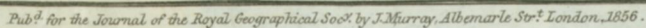
The next knowledge that we have is inferential. On August 21st, 1851, or 5½ years later, Dr. Rae, in his exploration of Wollaston Land, picked up in Parker Bay a portion of a *boat's* mast, marked S. C., with the broad arrow, showing it to be a portion of the mizen-mast of a second cutter in Her Majesty's service; and within half a mile of this was found a piece of oak, apparently part of a *boat's* awning-stanchion. These most certainly were a portion of the fittings of the unfortunate expedition, which had just come ashore with the flood tide.











In the following year Captain Collinson, when in Cambridge Bay (September 26, 1852), procured from the Esquimaux two metal adzes, fitted in deerhorn handles; one a part of a large metal crutch, with faint traces of the broad arrow, and the other was thought to be part of an iron connecting-rod, belonging to a steam-engine. These articles were afterwards recognised by Dr. Rae as part of an anchor, and some fittings of the boat left on the Coppermine River. There is a difficulty respecting the fragment of a door, or companion hatchway, found by Captain Collinson on the Finlayson Islands, in April, 1853. The latter was not part of a boat's fittings, nor was it recognised as a portion of the 'Terror.' It is possible that it may have come from the ships of the searching squadron, then congregated so numerously about Barrow Strait.

Nevertheless, the position of these articles is remarkable. It is at the head of the tide which comes from the north-east, as absolutely established by Dr. Rae, in August, 1851; the junction of the N.E. and N.W. flood-tides being near the Finlayson Islands. There is no indication whatever of the remains of a *ship* or *ships*. The companion-door, or hatchway, the only relic of a vessel found, would certainly be an evidence against* the supposition that the ships were wrecked, for had that calamity occurred, very many more remains of a different character, such as spars, planks, &c., would probably have indicated the fact on these well-searched shores.

Supposing my opinion to be correct, it is evident, then, that the 'Erebus' and 'Terror' have not met with any fatal disaster within the influence of the tidal or permanent current which reaches Dease Strait.

The other actual evidences which it is possible may be referred to the Franklin expedition, are those which have been found in May, 1851, up the Wellington Channel, by the parties under Captain Penny. Two of these have been reported on by Dr. Richardson and others. They may be enumerated thus: a piece of English elm, sawn and pitched, found in Record Bay, Baillie Hamilton Island; (it is possible that this weather-worn piece may have come from the encampment on Beechey Island;) a piece of pine, *recently* burnt, found by Mr. Goodsir, with another piece of pine in Disappointment Bay, north of Cornwallis Island. Other wood, found by Captain Penny, thus: an oak stave, 2 ft. long, with five hoop marks, on Point Surprise, Baillie Hamilton Island; one or two pieces of pine, on south shore of Deans Dundas Island; two pieces of pine, on Baring Island; and, in tracking back from Abandon Bay, some small pieces of driftwood.

* An opposite conclusion may be formed, since a further search may lead to other fragments.—G. B.

Mr. Goodsir found at the same time (May, 1851) a piece of American pine, 12 ft. long, and some very small pieces of pine, on the coast from Cape Austin westward. These might have been more abundant, but the track lay from point to point, and not round the bays, where they might have existed.

Now, it may be remarked that these were all found at that part of the Wellington Channel, where the influences of the drift from Barrow Strait and from the Polar Sea would meet (or as they did in September to November, 1850), as will be shown presently, and that they did not necessarily come from the northward. This last supposition added very greatly to the interest of the subsequent search up the Wellington Channel. They may also have come from Beechey Island in 1845-6, though the character of some of them will scarcely allow such a supposition.

To connect these distant evidences with the sad discovery of Dr. Rae,* at the mouth of the Back River in April and May, 1854, will require some speculation; but this, too, is much narrowed, if faith may be placed in two reports, which at the time were held to be true by some and denied by others. Our present knowledge will give great weight to these two reports, discarding the statement of Adam Beck.

The first of these is the report brought to England by Mr. Parker, of the 'Truelove,' a voluntary statement made by an Esquimaux at Pond Bay, in July, 1849.† He stated that two ships had been frozen up for three or four years on one side of Prince Regent Inlet, and two ships frozen up for one year on the other, and that he, the Esquimaux, had been on board all four ships in the previous April or May, 1849. Several discrepancies in the published statement have evidently arisen from ignorance of the Esquimaux language; but it was *firmly believed* and *acted on* by the masters of the whalers, who heard it.

The two lower ships in the Esquimaux' diagram, or those to the eastward, were evidently intended for those of Sir James Ross—the 'Enterprise' and 'Investigator'—at that time lying in Port Leopold, and are not those which had been longest there, as was supposed to be said. The other two ships must, therefore, be looked for to the westward, and were shown with their topmasts struck, and not in any enclosed harbour or space, as were Sir James Ross's vessels. The pathway between was misunderstood to be a communication between the four ships in proximity, but must refer to the Esquimaux' route.

In reconciling this statement with the explorations made, it may be positively assumed that the 'Erebus' and 'Terror' were not

* See Dr. Rae's Report, J. R. G. S., vol. xxv. pp. 246-256.—G. B.

† This statement was confirmed by a diagram which the Esquimaux drew of the position of the ships.

detained on the shores of Peel Sound (or *Inlet*), which have been explored by Sir James Ross, Lieut. Browne, Mr. Kennedy, and Lieut. Bellot;* nor on the north coast of Prince of Wales Land, which was scrupulously examined by the officers of Captain Austin's squadron; nor on its west or south-west coasts, which were travelled over by Captain Ommaney and Lieut. Sherard Osborn. The character of the ice met with by Lieut. Osborn would be a strong argument against the possibility of ships proceeding s.e. out of Melville Sound. Besides this we have the negative evidence of their non-existence, in the absence of all late Esquimaux reports.

It is then somewhere in Melville Sound that we may presume Franklin's four dreary years were passed. This enclosed sea is filled with *old* ice, piled up into hummocks, constantly receiving accessions from Banks Strait, and at intervals leaving it by Barrow Strait, which process of emptying does not appear to have taken place in 1848 or 1849, as neither Mr. Parker nor Sir James Ross were able to get through in those years, or beyond Croker's Bay in one case, or Cape Rennell in the other. In April, 1851, Captain Austin's officers found that between Griffith Island and Cape Walker it was *new* ice, but about Lowther Island and to the north of it, it was the *old* floe.

Having thus contracted the field of surmise, we may almost certainly believe that Sir John Franklin, after leaving Beechey Island in the open season of 1846, following his instructions, pushed forward for the "space between Melville Island and the north coast of America;" and having proceeded up Melville Sound, became imbedded in the pack, as Captain Kellett did in 1854, and perhaps about the same spot. The seasons after were probably severe; we know that 1848 and 1849 were, and thus the eastward drift was slow, but may not have entirely ceased. Thus

* Peel Sound has evidently no direct connexion with Victoria Strait. Sir James Ross, whose chart of 1849 has since been followed, was not assured of the continuity of the coast on its east side, which he laid down south of lat. $72^{\circ} 44'$, the farthest point attained; and his Cape Bird is a hill. Mr. Kennedy believed, and Lieut. Bellot says positively, that the land is continuous to the n.w. of the so-called Bellot Strait, and that the islands, marked by Sir James Ross, are hills on a plain. They are the Union Mountains of Sir John Ross in 1829. Lieut. Browne (in May, 1851) believed that Peel Sound was frozen solid to the bottom; there were no tide-marks, the ice was smooth, and it was manifestly seldom, if ever, open to navigation. The 'Erebus' and 'Terror' therefore could not have passed by Peel Sound into Victoria Strait.

Victoria Strait must run n.w. from Gateshead Island (or towards Banks Strait), in the same direction as the greater part of these shores. There is some evidence of this in the vast pressure of ice from the n.w. against the southern coast of Prince of Wales Land, described by Lieut. Sherard Osborn, which would indicate a s.e. current, as well as the effects of wind. The distance between the termination south-westward of Lieut. S. Osborn's journey, May 23, 1851, and that of Lieut. Wynniett from the west, May 26, 1851, must be at least 118 or 120 miles, instead of 80 miles, as is shown on recent charts.

the 'Erebus' and 'Terror' slowly drifted back toward Barrow Strait, and approached Prince of Wales Land, where they were visited by the Esquimaux, at the time that Sir James Ross was in Port Leopold; and in 1850, when the season opened, the ships, having to pass through the contracted channels formed by the islands north of Cape Walker, became nipped and raised on to the hummocky ice, by which process they were rendered unseaworthy. They may have been now dismantled, and the crews taking their boat and sledges may have passed down Peel Sound; or they may have travelled along the western shore of Prince of Wales Land, and thus reached the north shore of King William Land, at the latter end of the summer of 1850, in a state of destitution.

As to the course pursued after the opening of the ice in 1846; it may have been late, perhaps September, this year, but there is no evidence of more than one season being spent at Beechey Island. It is thought by several, whose opinions are entitled to every respect, that they went up Wellington Channel. There is no evidence to contradict this. But when the Grinnell expedition entered this channel in 1850, Dr. Kane considered that the ice which filled it was at least *two* years old. Giving due weight to this supposition, there is no reason for thinking that it had been traversed at least later than 1847 or 1848. But in any case it must be considered that the ships ultimately found their way into Melville Sound, it might be by Byam Martin Channel. Had they have passed a winter near the shores of Penny's Strait, it would be reasonable to expect that some indications would have been met with by Commander Richards or Lieut. Sherard Osborn in their explorations of the north shore of the Parry Islands in April to July, 1853. It is possible that they may even have found their way farther to the northward than these journeys extended; but in any case it may be asserted that they ultimately reached Melville Sound, for had they have left their ships to the northward, the traces of the retreating party towards the Back River must have been crossed by some of the numerous travelling parties on either side of the Parry Islands.

Against all this reasoning we have the evidence of the Pond Bay Esquimaux, be it of what value it may, that two ships had been frozen up for *four* winters. It is strenuously asserted that the final separation from the ships occurred in Melville Sound, and may have been caused by damage to the vessels at the end of 1849 or commencement of 1850; or, if that catastrophe occurred previous to that date, they may, from the nature of the ice, have been beyond the reach of the land, till the ever-continuing eastward drift of the ice brought them within reach of its eastern shores. It may be urged against the inference that these three or four winters were passed in inactivity in Melville

Sound, that their crews would have made some attempt to communicate with the Hudson Bay posts. But to this it may be said, that the crews would naturally keep to their ships as long as there was hope of their extrication, or to the limit of their endurance, the latter of which was reached, and the former past.

It may be proper to allude to the reports sent home from Kotzebue Sound in 1851-2, from the natives to the east of Point Barrow.* There are several of these relating to white men and a three-masted ship having been seen on the coast in 1849; but these testimonies are so vague, and may have arisen from affirmative answers being given to leading questions—a very common practice—that much weight cannot be given to them, if they are at all worthy of consideration.

The information obtained by Dr. Rae was that the party were travelling southwards, with a boat and sledges, in the spring of 1850.† The distance from where it may be presumed they were first seen to Cape Walker is 270 miles. Having a boat to drag, their progress would be slow, perhaps not more than 4 or 5 m. per day made good. This would bring the commencement of their journey from Barrow Strait up to January or February, 1850, supposing them to have travelled in mid-winter; otherwise their journey would reach up to the autumn of 1849.

It is very improbable that the ships still remain in Victoria Strait or Peel Sound, the only portion of the Arctic Archipelago which has not been strictly examined. The Esquimaux were informed by the retreating party that their ships were *crushed* by the ice, and should they have been destroyed in Peel Sound, some of the wreck (besides a hatchway door) would have reached Wollaston Land. If they had remained *fixed* in that part—a case beyond supposition—the fact would have been known to the Esquimaux, and their locality been told to Dr. Rae in 1854. It may be positively stated that they came from the north-west, and not from the *east* side of Peel Sound. One circumstance, to which attention is particularly directed, will prove this. The depôt of provisions left on Fury Beach in 1825 and 1833, on the west side of Prince Regent Inlet, which was well known to exist by Sir John Franklin's party, was found still there by Mr. Kennedy and Lieut. Bellot in March, 1852.‡ The fugitives were making the best of their way toward the Hudson's Bay settlements, and could not afford time for the chances of finding this depôt in the same state that it was left. Another circumstance also bears on this point. If the boats or ships had entered Prince Regent Inlet (a part much to be avoided) and met with

* See Parliamentary Papers, 1852.

† See 'Naut. Mag.,' Nov. 1854, p. 613.

‡ See 'Journal of Royal Geographical Society,' vol. xxiii., 1853, pp. 126 and 129.

any disaster, some of the remains would have reached Pelly or Committee Bays, which were searched by Dr. Rae, as both Parry in 1825, and Bellot in 1852, remark on the generally *southern* set of the ice, which prevails for seven out of ten days.

It is possible that Melville Sound may contain some hitherto unknown land, which was the scene of the wintering between 1846 and 1850. It may be filled with ice of such an impracticable nature, from its heaped up and broken state, that travelling over it may have been impossible.

Should this process of reasoning be held valid, it may be expected that no record of their track exists along Victoria Strait but those found by Dr. Rae and Captain Collinson to the south-west. The Hudson Bay Company's Expedition, sent by direction of Government, under Messrs. Anderson and Stewart, have therefore failed in gaining any knowledge of the fate of the ships beyond the confirmation of the boat party on Montreal Island. The dismantling of the ships in Barrow Strait may have been the origin of those pieces of driftwood up the Wellington Channel.

Of the ships themselves, not the slightest vestige has been found in the Arctic searches, nor a single article which may be referred to their destruction. We may then more safely believe that they were the two ships seen on an ice-floe, *not an ice-berg*, as generally but erroneously stated, on the Northern edge of the Newfoundland Bank, by the 'Renovation' on April 20, 1851. The credibility of the report and the possibility of the occurrence have each been contested.

First—as to the credibility of the report: the most rigid and searching inquiry failed to shake the testimony of numerous witnesses dispersed over various parts of the world, and who could have no possible object in combining to deceive. Minor discrepancies may have arisen, but the general evidence is untouched. Captain Ommaney, R. N., who took an active part in the inquiry, says, "that two vessels were seen in the position described, there seems to be not a shadow of doubt." And if so, the exact accordance in the appearance of the reported ships, and almost impossibility of there being any other similar ships—leads me to the irresistible conclusion that they were the 'Erebus' and 'Terror.'

Secondly—as to the possibility of the occurrence. We may find many recorded facts which will demonstrate the perfect consistency of such an appearance with physical phenomena. As the examples I would wish to mention will throw considerable light on the current systems around Greenland, as well as on the sustaining powers of ships in such situations, I will enumerate them, in addition to the information afforded by the diagram. Proceeding chronologically:—

The Dutch or Danish Greenland fleet, wrecked in 1777, in lat. 78° or 80° and long. 5° or 6° E; the last survivor drifted to lat. 62°, long. 40° W., about 1300 m. in 108 days, or 12 m. per day.*

The 'Henrietta' of Whitby, beset in 80° N., 6° E., drifted first W., then S., to lat. 73½°, long. 9°; 8½ m. per day.†

On May 5, 1817, four vessels were wrecked in 78° N. and 3° W., and found floating May 18, in 75° 28' N. and 10° W., or 182 miles in 13 days, or 14 m. per day. At the end of May they were seen in lat. 73½°.‡

Captain Scoresby himself was drifted from July 1, 1817, lat. 75½° and long. 8 W., 110 or 120 m. to S., at 12 or 13 m. per day.§

Admiral Taylor relates the circumstance of a whaler, who was wrecked off Spitzbergen; the men taking to their boats, one of which became fixed in the ice, and drifted around Cape Farewell up to about 65° N., where the last survivors were rescued.||

Captain Back in H.M.S. 'Terror,' (the fate of which we are now inquiring into,) was drifted in the ice to the S.E., from September 20, 1836, to July 1837. She was imbedded for 118 days, and although crushed and in continual peril from the proximity of the land, her commander was enabled to bring her home.

Captain Bird in H.M.S. 'Investigator,' threw overboard a cask in lat. 73° 50', long. 78° 6½', on August 28, 1848. It was picked up off Cape Hooper, October 1, 1848, lat. 68° 10', long. 64° 30', having drifted 440 miles in 33 days, or 13·3 m. per day.¶

Sir James Ross's Expedition was drifted from a point north of Leopold Island on September 1st, 1849, to Cape Graham Moore on September 24, a distance of 260 m., or 11 m. per day.

The drift of the first Grinnell Expedition, under De Haven and Kane, is the most parallel case to that now supposed to have occurred to the 'Erebus' and 'Terror,' inasmuch as it occurred about the same year.

The 'Advance' and 'Rescue' became beset on their return from Griffith Island in the entrance of the Wellington Channel, September 14, 1850. They then drifted up that channel to the north, making the discovery of Grinnell Land, and scarcely at any time going southward till October 1st, when the spring tides counteracted the northward tendency, and the two beset ships passed southward again, reaching Cape Hotham on October 8. This drift is more particularly noticed to account for the drift-wood from the south about Baillie Hamilton Island. It may perhaps be also an index of the time when that drift occurred.

* Dr. Scoresby, pp. 216-7; see also note †, at p. 36 of this.

† Ibid.

‡ Dr. Scoresby, pp. 216-7.

§ Ibid.

¶ Parliamentary Papers, 1851, vol. xxxiii.

¶ 'Naut. Mag.,' Dec. 1848.

The Grinnell ships remained moving about Beechey Island till November 17th, drifting slowly till December 1, when they passed eastward out of Lancaster Sound, and were not released till June 5, 1851, in lat. $66^{\circ} 33'$, long. $59^{\circ} 6'$, off Cape Walsingham, a distance of about 780 m., at an average rate of 4.2 m. per day. The total linear drift was 1050 m., and they were imbedded and uninjured in the same floe for 15 months.

A later, and, except as to time, a more similar case, is that of Captain Kellett's ship, the 'Resolute,' which drifted from Melville Sound between May 15, 1854 to Cape Enderby in the middle of October, 1855, a distance of 960 m. in 17 months, and apparently found uninjured.

There is thus no difficulty in comprehending that the Franklin ships may have drifted from Melville Sound as far as, or beyond Cape Walsingham, imbedded in the same floe. A perusal of the admirable work of Dr. Kane will throw great light on this possibility.

To carry the ice drift still farther southwards, we may find very numerous examples and arguments in the abundance of the ice, that is periodically met with drifting down to and into the gulf stream. The zeal of Mr. Redfield has collected a very large number of instances *—

One or two examples which I have found will be sufficient, as they refer to the time in question.

The 'Carlo Mauran,' commanded by Mr. Tillinghore, passed on May 23, 24, 25, 1851, between lats. 44° and 45° , and longs. 49° - 54° large quantities of ice.†

On June 27, 1851, the Washington Steamer, from New York to Southampton, passed 10 very large ice-bergs between longs. 50° - 45° in lat. 47° .‡

It is probable that the southward current runs more strongly to the southward of Cape Walsingham, as it will be joined by the branch which sets northward along the Danish settlements of Greenland, and with still greater velocity below the parallel of Cape Farewell, as the current which passes between East Greenland and Iceland will afterwards unite with the Davis Strait current, and thus united bear down towards the Labrador coast. This westward tendency of the currents in these latitudes must be owing to the effect of the rotation of the earth; the velocity of which very rapidly increases southwards in these parallels.

In tracing what may have been the drift of the ice-floe with the two ships from the northward, our data thus vary very considerably; but from what has been said it may be presumed

* See Purdy's Atlantic Memoir, 1853, pp. 490-493.

† 'Shipping Gazette,' June 18, 1851.

‡ Ibid., July 4, 1851.

that with a drift of 12 m. per day, they would have been off Cape Walsingham (1200 m. distant) about January 20, 1851: 12 m. = 100 days—April 20 = January 20; or if 18 m. per day about February 3: 18 m. 66 6 days—April 20 = February 3.

From hence to Lancaster Sound occupied 6 months by the Grinnell Expedition: 6 months—January 20, 1851 = June 29, 1850; or as by the cask from the 'Resolute' 44 days: 6 months—February 3, 1850 = July 3, 1850; a very wide difference. At the slowest rate they would have been off Lancaster Sound about July 3 or June 20, 1850: 44 days—January 20, 1851 = December 6, 1851; at the quickest, December 6th or 19th, 1850: 44 days—February 3 = December 19, 1851. From thence to Wellington Channel, at the rate of Sir James Ross's drift, they would have been there in May or June or November or December, 1850, at the quickest or slowest of the foregoing rates of travelling.

At the same rate of drift as the 'Resolute,' May 1854 to October 1855: 18 months + 85 days—April 20, 1851 = July 25, 1849; they might have left the longitude of 101° or 102° W. in August or September, 1849: 18 months + 60 days August 15, 1849.

We have thus a series of precedents, by which it may be estimated that they may have been off Peel Sound between August 1849 and May 1850.

The first of these periods, August 28, 1849, is precisely that when Sir James Ross left Leopold Harbour, and included the period when the Esquimaux of Pond Bay said that he had visited them.

The Arctic squadron under the orders of Austin, Ommaney, Penny, Sir James Ross, and De Haven, got into Lancaster Sound in August 1850, and were all, except the Grinnell Expedition, congregated about Griffith Island, as before stated, by September 10 or 12—their cruising then had been chiefly on the north side of the Channel.

It is therefore manifest that the 'Erebus' and 'Terror' *may* have passed unobserved down Barrow Strait *after* Sir James Ross's departure, and *before* the arrival of the Austin squadron. Upon this reasoning therefore, the object of this paper is to demonstrate the *possibility*, and if so, the almost *positive certainty*, that the ships seen April 20, 1851 on the Newfoundland Banks, were the 'Erebus' and 'Terror'; that their presumed course will perfectly coincide with Sir John Franklin's instructions and with the discoveries of Dr. Rae and others; and that the points, here urged, may be accepted among the vast amount of speculation which has arisen, as an approximation to the reality.